Chapter 1 Scope and Methods

The United States Environmental Protection Agency (EPA) has prepared the *Clean Watersheds Needs Survey (CWNS) 2004 Report to Congress*, hereinafter referred to as "this Report," in compliance with section 516(b)(1)(B) of the Clean Water Act (CWA). This is the 14th survey. The first occurred in 1972, and the 13th survey addressed needs as of January 1, 2000.

This Report includes a presentation and analysis of the capital investment necessary to meet the Nation's wastewater treatment and collection system needs, as well as its municipal stormwater management program and recycled water distribution needs.

This Report is a collaborative effort between 49 States, the District of Columbia, Puerto Rico[5] (collectively referred to as *States* for the remainder of this Report) and EPA.

The CWNS 2004 National Workgroup (whose members are denoted by an asterisk in the acknowledgements) developed a set of guidelines and criteria for gathering, documenting and entering data. The CWNS 2004 National Workgroup set the primary objective of updating and entering new documented costs using the most current planning documents available. This emphasis on using current documents extends the effort begun in 2000 to rely exclusively on documented needs. Another objective was continuing to expand the use of CWNS as a tool for States to plan, evaluate and set priorities regarding their needs. This objective was supported by previous extensive State efforts and encouraged new efforts to improve geographic, permit and other technical data in the survey. Special emphasis was placed on documenting CSO needs and improving the level of stormwater reporting.

> ***CWNS Report to Congress and the Clean Water Act***
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> Section 516(b)(1) of the Clean Water Act (CWA):
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> "The [EPA] Administrator, in cooperation with the States, …shall make …(B) a detailed estimate…of the cost of construction of all needed publicly owned treatment works in all of the States…"

Types of Needs in This Report

Using recommendations of the CWNS 2004 National Workgroup, EPA defined a *need* as a project, with associated costs, that addresses a water quality or public health problem existing as of January 1, 2004. CWNS project eligibility rules are generally based on eligibility rules for project funding under the Clean Water State Revolving Fund (CWSRF) program.[6] Chapter 2 summarizes the national needs for POTWs, as defined in CWA Section 516(b)(1)(B), using CWSRF funding eligibility categories (Table 1-1). Detailed descriptions of the CWNS 2004 needs categories are provided in Appendix F, Table F-1.

[5] Alaska, American Samoa, Guam, Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004.

[6] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS. Additionally, the main body of this Report focuses on needs related to POTWs as directed by section 516(b)(1)(B) of the CWA. However, other types of activities, such as NPS, are eligible for CWSRF funding.

Table 1-1. CWNS 2004 Needs Categories

CWA Section 212 Wastewater Treatment & Collection	Category I:	Secondary wastewater treatment[a]
	Category II:	Advanced wastewater treatment[b]
	Category III-A:	Infiltration/inflow correction
	Category III-B:	Sewer replacement/rehabilitation
	Category IV-A:	New collector sewers and appurtenances
	Category IV-B:	New interceptor sewers and appurtenances
	Category X:	Recycled Water Distribution[c]
CWA Section 212 Wet-weather	Category V:	Combined sewer overflow correction
	Category VI:	Stormwater management programs

[a] In previous surveys, Category I included individual septic system and decentralized sewage treatment need
[b] This category may also include additional process units to increase level of treatment to allow for water reuse.
[c] New category for CWNS 2004, previously reported as Categories I, VII-D and VII-E

This Report also summarizes the technical data (e.g., population, flow and effluent data, where applicable) for every facility included in the CWNS 2004. The national-level results and analyses of the needs and technical data are included in Chapter 2. The relationship of CWNS needs to funding is discussed in Chapter 3. CWNS 2004 needs and technical data (e.g., population, flow) are presented in Appendices A and C, respectively. Appendix B summarizes the CWNS 2000 and CWNS 1996 needs information.

This Report, however, does not include all needs related to water quality and public health problems. As in past surveys, information about privately owned wastewater facilities or wastewater treatment facilities that serve privately owned industrial facilities, military installations, national parks or other Federal facilities was not collected. These facilities are not eligible for funding under State CWSRF programs.

Similarly, the CWNS 2004 did not request data for needs and facilities that serve American Indians and native villages, hereinafter referred to as Tribal needs.[7] EPA does not include or report Tribal needs because the Indian Health Service (IHS) conducts a separate survey and provides a report to Congress annually under Public Law 86-121. The IHS reports on wastewater treatment systems, improvement of community drinking water supplies and solid waste disposal facilities. A special set-aside of the CWSRF appropriation provides funding for Tribal needs on the basis of a priority list of projects, updated annually by the IHS.

CWNS History and Relationship to the CWSRF

In 1972 EPA began collecting information about needs to meet the requirements of sections 516(b)(1)(B) and 205(a) of the CWA in support of the Construction Grants Program. EPA conducted 11 biennial surveys between 1972 and 1992. For the duration of the Title II Construction Grants Program, the survey focused on providing an estimate of current capacity and future needs for publicly owned treatment works (POTWs). Between 1972 and 1996, $61.1 billion was awarded to municipalities through EPA's Construction Grants Program.

In 1987 Congress added Title VI to the CWA to extend Federal aid for wastewater treatment plant construction and to provide grants to States to capitalize the CWSRF. The amendments resulted in a transition toward State and local government responsibility for financing clean water projects.

As of June 30, 2004, capitalization grants under the CWSRF Program totaling $21.9 billion had been awarded to State CWSRF programs. States in turn provided assistance of $47.9 billion, mostly in the form of loans to communities.

[7] Needs for 34 of the 562 Federally recognized Tribal facilities were voluntarily reported by States to the CWNS. To avoid confusion with needs reported in IHS annual surveys (www.ihs.gov), Tribal needs are not included in this Report.

Time Frame for Needs in This Report

For inclusion in this Report, a need had to address a water quality or public health problem that existed as of January 1, 2004. This Report compiled short-term and long-term needs that could be documented in accordance with nationally uniform standards.

Unlike wastewater infrastructure planning during the 1970s and 1980s, which primarily used a 20-year planning horizon (as influenced by this requirement of the Title II Construction Grants Program), more recent wastewater infrastructure planning horizons vary considerably across the United States. With greater flexibility granted to States and local communities for managing construction activities, this planning horizon is now as short as 5 years or less and as long as 20 years or more.

This Report does not estimate complete 20-year needs for the Nation, because it relies on State and local documents of varying time horizons rather than a uniform planning horizon. Other recent studies, such as the Water Infrastructure Network Report (WIN 2000), EPA's Gap Analysis (USEPA 2002a), and the Congressional Budget Office's Water Infrastructure Study (CBO 2002) have been developed to estimate a more comprehensive picture of the Nation's needs. For this Report, costs beyond 20 years have been excluded.

Data Entry Procedures

Building on prior surveys, the CWNS 2004 National Workgroup set the following priorities for improving CWNS 2004 data:

- Update existing costs and enter new costs for all categories of needs using the most current planning documents available.
- Emphasize the use of long-term control plans (LTCPs) or other acceptable documentation for CSO needs, especially for facilities with previous CSO cost curve estimates exceeding $120 million.
- Confirm linkages to the Permit Compliance System (PCS) by reviewing the permit data in the CWNS database.
- Identify documented needs related to sanitary sewer overflows (SSOs) by indicating which needs in other categories also address SSOs.
- Improve documentation of stormwater and NPS needs and document all individual sewage disposal system (ISDS) and decentralized treatment needs in the new Category VII-L.
- Continue to expand the CWNS as a tool for States to plan, evaluate and set priorities regarding their needs by maintaining technical data.

EPA and the CWNS 2004 National Workgroup developed data entry guidance and presented this to States at a national start-up meeting in April 2004. EPA also provided data from the CWNS 2000 as a baseline for the CWNS 2004 data entry effort. States entered data into the CWNS 2004 database from May 1, 2004, through February 18, 2005.

To clarify issues raised by States throughout the data entry period, EPA held monthly conference calls, provided additional training opportunities and delivered information to the States through the Internet, e-mail, and written correspondence.

CWNS 2004 Database

The CWNS 2004 database allowed States to enter detailed information about each facility, such as discharge locations, levels of treatment, populations served and funding awards.

The CWNS 2004 database contains information on 33,852 facilities. Of these, 24,268 are existing or projected facilities with centralized wastewater treatment and collection (including 747 combined sewer systems with documented needs), and 1,255 are municipal stormwater management program facilities.

The information gathered by the States is organized by two main categories of data: wastewater treatment/collection systems and stormwater management programs. Detailed descriptions of these categories and a list of data elements are provided in Appendix D.

CWNS Database

States entered and updated their needs data in the CWNS database. The database contains detailed information about each facility, including geographic coordinates, population, flow discharge locations, watershed boundaries and funding information.

States use the database to continually update their data, generate reports and download data into their geographic information systems (GISs) to create maps. These capabilities enable States to use the CWNS database as a dynamic management tool rather than simply a reporting vehicle.

Documentation of Needs

CWNS reports prior to 2000 included needs based on both documents as well as data models. Beginning with the CWNS 2000 report and continuing with this Report, rigorous documentation was required to validate needs and to ensure the quality of cost and technical information. In addition, whereas modeling needs results in only State- and national-level estimates, the documentation of needs provides a rich source of site-specific, high-quality data for EPA, States and the public. This information is useful in a variety of watershed-based analytical tools that support efficient meeting of water quality and public health objectives.

Facility

A location involved in water quality management. A facility can be a wastewater treatment plant, a wastewater sewer system, or a municipal separate storm sewer system. Data in the CWNS 2004 are collected and organized by facility.

Documentation Criteria

EPA, in consultation with the CWNS 2004 National Workgroup, established seven criteria for States to document each need:

1. A description of the water quality impairment and information on the potential source. The problem description should include specific pollutant source information. A general statement about water quality impairment does not meet this criterion.
2. The location of the problem, included as a latitude/longitude point.
3. One or more specific pollution control measures or BMPs used to address the problem.
4. The cost to implement each pollution control measure or BMP. General estimates for the problem area were not permitted; only site-specific data were acceptable to generate the costs.

5. The source of the costs (e.g., an engineer's estimate, facility plan, cost of comparable practices, estimates from equipment suppliers) for each solution.
6. The total costs for all pollution-control measures and BMPs documented for a facility (all costs were converted to January 1, 2004, dollars for this report.)
7. If a facility need was greater than $20 million (January 2004 dollar base), the documentation date had to be January 1, 1998, or more current; for all other facility needs, the documentation date had to be January 1, 1994, or more current.

For criterion 4, CWNS 2004 cost eligibility was based on a subset of CWSRF-eligible[8] costs that meet the definition of a need as addressing an existing water quality or public health problem. *The Clean Water State Revolving Fund Funding Framework* (USEPA 1996) allows CWSRF funding of *capital*-only projects. For point source projects, this term includes activities such as constructing wastewater treatment facilities to meet water quality or NPDES permit requirements. Operation and maintenance (O&M) costs, ineligible for CWSRF funding, were not included in this Report as needs.

Criterion 7 applied to both the cost data and the need justification of a water quality or public health problem. The purpose and benefits of redocumentation of outdated facility information during each survey is to maintain only current project cost information in the CWNS 2004, as well as to purge projects that might have been completed or partially undertaken.

Acceptable Document Types

To maintain quality and consistency in documentation of needs from State to State, the CWNS 2004 National Workgroup approved a list of documentation types (Table 1-2 and Appendix G).

For acceptance of the CWSRF-eligible portions of costs for developing and implementing stormwater management programs for municipal separate storm sewer systems (MS4s),[9] States had to include evidence that they were part of the municipality's MS4 program or a related planning document for achieving the water quality objectives of the NPDES MS4 program.

Cost Curves

Once a State adequately documented a water quality or public health problem, EPA accepted the documentation for the purposes of the CWNS 2004, regardless of whether a documented cost estimate was available. States could use a separate document to justify cost estimates. When information was inadequate for States to document a cost estimate, States could estimate costs by using nationally derived and EPA-approved construction cost curves available in the CWNS 2004 database system. This approach allowed States to use a wide variety of documents to justify needs rather than being restricted to those containing cost data.

Cost curves were available to calculate costs for Categories I and II (new or replacement treatment facility costs for increased capacity and/or increased level of treatment and disinfection), Category IV (sanitary sewer collection system costs for new or expanded collector sewers and interceptor sewers), and Category V (CSO correction costs). Chapter 2 provides additional discussion of the CSO cost curve.

[8] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS.

[9] As required by Phase I and Phase II NPDES permits.

The cost curves were unchanged from those available in the CWNS 2000 except for the adjustment for the base year. The cost curves used technical data in the CWNS 2004 database, such as area multipliers, along with appropriate user-provided input data, such as population served, to estimate a cost for the specified project or need.

Table 1-2. Approved Types of Documentation for Official Needs in CWNS 2004

Document Type Code	Document Type	January 2004 Dollars (billions)	Percentage of Total Need (%)
01	Capital Improvement Plan	87.7	43.3%
02	Infiltration/Inflow Analysis	0.1	< 0.1%
03	Sewer System Evaluation Survey	1.9	0.9%
04	Final Engineer's Estimate	11.9	5.9%
05	Cost of Previous Comparable Construction	0.9	0.4%
06	Facility Plan	35.1	17.3%
07	Plan of Study	< 0.1	< 0.1%
08	Intended Use Plan	9.8	4.8%
09	State Approved Area-Wide or Regional Basin Plan	3.1	1.5%
10	Federal/State Grant or SRF Loan Application Form	4.7	2.3%
11	State Priority List	< 0.1	< 0.1%
12	Diagnostic Evaluation of Wastewater Treatment Plant Demonstrating Need to Construct	< 0.1	< 0.1%
13	Administrative Order/Court Order/Consent Decree	0.1	< 0.1%
14	Sanitary Survey or Certification of a Health Emergency	0.2	0.1%
15	State-Approved Local/County Comprehensive Water & Sewer Plan	2.6	1.3%
17	State Approved Municipal Wasteload Management Plan	0.1	< 0.1%
18	Total Maximum Daily Load (TMDL)	< 0.1	< 0.1%
21	NPDES or State Permit Requirement (w/schedule)	0.1	< 0.1%
22	Municipal Stormwater Management Plan	0.5	0.2%
28	Funding Application (Population < 3,500)	0.2	0.1%
29	State Needs Survey (Population < 3,500)	0.6	0.3%
30	Model Survey (Population < 3,500)	0.6	0.3%
31	Information from Assistance Provider (Population < 3,500)	< 0.1	< 0.1%
36	Long-Term Control Plan (CSO Control Plan)	7.3	3.6%
98	CSO Cost Curve (if LTCP is not available)	29.3	14.5%
99	EPA-HQ Approved	5.7	2.8%
Total		**202.5**	

Additional Documentation Options for Small Communities

In the past, national small community needs tended to be underestimated[10] in CWNS reports because small communities have fewer resources available for monitoring and facility evaluations, which form the basis of the reports used to document needs. In an attempt to more fully capture the needs of small communities, EPA and the CWNS 2004 National Workgroup established guidelines to allow small communities to use alternative forms of documentation that were not acceptable from large communities.

[10] Analysis of small community need reporting levels is included in *Drinking Water and Wastewater Infrastructure in Appalachia: An Analysis of Capital Funding and Funding Gaps* (Hughes et al. 2005)

Small communities with a January 2004 population of fewer than 3,500 people were allowed to use alternative documentation when standard documentation was not available.[11] Alternative documentation required a description of the proposed project, an explanation of why the project was necessary (e.g., public health or water quality problem), and a statement of how the project would benefit the community. This information was submitted on a standardized survey form that required signatures from suitable community and State officials. As with standard documents, if cost estimates were not provided, the State could use construction cost curves for Categories I, II, IV, and V to estimate the costs.

Data Quality Assurance

EPA conducted a quality control and quality assurance review to ensure the precision and accuracy of the data and to minimize the level of uncertainty of data submitted for this Report. To meet this objective, EPA developed a Quality Assurance Project Plan (QAPP) in accordance with EPA's guidelines for review of secondary technical and cost data (EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, EPA/240/B-01/003)). As part of this QAPP, EPA developed specific and well-defined standard operating procedures for the review of facilities with various degrees of technical data and cost estimates. The QAPP defined processes for EPA to monitor adherence to quality control procedures and quality assurance requirements.

A team of reviewers used the QAPP operating procedures to review the data entered into the CWNS 2004 database by individual States. These procedures included comparing hard copy documentation with data entered in the CWNS 2004 database, as well as ensuring consistency of technical and cost data. Where necessary, the review team consulted with EPA State Revolving Fund experts to clarify CWSRF eligibility requirements.

Other Documented Needs

Needs that met CWNS documentation requirements but are not defined in CWA section 516(b)(1)(B) are summarized in Appendix A, Table A-2. This table includes nonpoint source (NPS) pollution control (Category VII) needs that are associated with implementing NPS management programs under section 319 of the CWA, as well as developing and implementing Comprehensive Conservation and Management Plans (CCMPs) for estuaries under section 320 of the CWA.

Separate State Estimates

In cases where available documentation did not meet all seven basic criteria or where the needs could not be estimated using available cost curves, States could enter needs as Separate State Estimates (SSEs) without EPA review. These estimates are entered for States' purposes other than this Report, such as State level planning as well as communication with State legislatures and other groups involved with addressing and preventing water quality problems.

SSEs are reported separately at the end of Chapter 2 and at the State level in Tables A-11 through A-13 in Appendix A. Technical data (e.g., population, flow, effluent) associated with each SSE facility are included throughout this Report in various tables and charts.

[11] Standard document types are listed in Appendix G, Table G-1, document types 1 through 27. Alternative documents available for communities with current populations of fewer than 3,500 people are listed as document types 28 through 31 in the same table.

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